

What is claimed:

5 1. A vehicle door equipped with a door truss comprising  
at least two impact beams 1, 7, 1B, 7B and  
at least one window-guide element 6, 6B, 6.1, 6.2, 6.1B, 6.2B, 6.1a, 6.2a, 6.1aB, 6.2aB  
to guide and receive a window pane,  
where  
\* the following clamping means (clamping parts / clamping parts) such as clamping holes /  
clamping blocks 15.1 to 15.5a, 15.7, 15.8, 30 to 37 and clamping hooks 15.6 /  
10 reinforcing rod 17.1d, with the exception of clamping part 15.4a, are equipped with  
means to adjust to permissible tolerances (clearances) and  
\* the vehicle is equipped with the following compound pairs (vehicle parts / vehicle parts)  
such as vehicle door / vehicle roof 17, vehicle door / side rail 18, vehicle door / post  
section(s), vehicle door 8 / vehicle door 8B and vehicle door / passenger compartment  
15 21,  
characterized by arrangement of  
- a number of clamping parts to the window-guide element and  
- the respective clamping parts to vehicle roof 17 and side rail 18  
20 to define the clamping means such as clamping holes (clamping apertures, clamping oblong  
holes) / clamping blocks 15.2, 15.2a, 15.4, 15.4a, 15.7, 15.8, whose connection is form-  
locking by adjustment to the permissible tolerances when door is closed, for the purpose of  
perfect inter-engagement in the state of deformation in the event of real arbitrary collision  
(side collision and/or rollover) and inter-clamping due to the increase of impact energy, so  
that all doors are  
25 - always interlocked to protect passengers against ejection from the passenger  
compartment and  
- connected with vehicle roof 17 and side rail 18 of the vehicle frame to lower stress due  
to the increase of structural stiffness and the energy distribution.  
30 2. A vehicle door in the event of real arbitrary collision according to claim 1, characterized  
by arrangement of  
- several clamping parts to the upper part of the window-guide element and  
- the respective clamping parts to vehicle roof 17  
35 to define the clamping means: reinforcing rod 17.1d / several clamping hooks 15.6.  
3. A vehicle door in the event of real arbitrary collision according to at least one of  
preceding claims, characterized by arrangement of  
- several clamping parts to the lower part of the window-guide element and  
- the respective clamping parts to side rail 18  
40 to define the clamping means: reinforcing rod 17.1d / several clamping hooks 15.6.  
4. A vehicle door in the event of real arbitrary collision (front-, rear-, side collision and/or  
rollover) according to at least one of preceding claims, characterized by arrangement of  
- a number of the clamping parts of clamping means: clamping holes / clamping blocks 33,  
45 34 to a post section having a part of door lock and  
- the respective clamping parts to the window-guide element of vehicle door 8, 8B  
adjacent to said post section.

5. A vehicle door in the event of real arbitrary collision according to at least one of preceding claims, characterized by arrangement of

- at least one pair of the clamping holes to both legs of U-shaped block 17.3, 18.3 in the common post section of vehicle doors 8 and 8B in juxtaposition and
- the respective clamping parts 15.3, 15.3a, 15.5, 15.5a to both window-guide elements of said vehicle doors.

6. A vehicle door according to claim 5, wherein the U-shaped block 17.3 as connection element of the vehicle doors, post section and vehicle sides is

10 - in force-locking connection with clamping parts 15.3, 15.3a of said vehicle doors in juxtaposition and

- in force-locking connection with said common post section of said vehicle doors, reinforcing panel 17.1b disposed along the vehicle roof and transverse girder 17.2c of the common post sections of both vehicle sides facing each other.

15 7. A vehicle door according to at least one of claims 5 and 6, wherein the U-shaped block 18.3 as connection element of the vehicle doors, post section and vehicle sides is

- in force-locking connection with clamping parts 15.5, 15.5a of said vehicle doors in juxtaposition and

20 - in force-locking connection with the common post section of said vehicle doors, reinforcing panel 18.1b disposed along the side rail and transverse girder 18.2 of the common post sections of both vehicle sides facing each other.

8. A vehicle door according to at least one of preceding claims, characterized by arrangement of

25 - a number of the clamping parts of clamping means: clamping holes / clamping blocks 15.1, 31, 36 to a post section, whereto the vehicle door is pivotally attached, and

- the respective clamping parts to the window-guide element of the vehicle door adjacent to said post section.

30 9. A vehicle door according to at least one of preceding claims, characterized by arrangement of

- a number of the clamping parts of clamping means: clamping holes / clamping blocks 30, 32, 35, 37 to passenger compartment 21 and
- the respective clamping parts to the window-guide element.

35 10. A vehicle door according to at least one of preceding claims, characterized by arrangement of several clamping means in different operating planes of a compound pair: vehicle door / vehicle part.

40 11. A vehicle door according to claim 7, wherein a belt case 26 is housed in U-shaped block 18.3.

45 12. A vehicle door according to at least one of preceding claims, characterized by use of one stiff U-shaped window-guide element 6, 6B, both ends of which face the lower vehicle part and whose upper part faces the upper vehicle part for the purpose of receiving their respective clamping parts.

13. A vehicle door according to claim 12, wherein both ends of stiff U-shaped window-guide element 6, 6B are force-locking connected with each other by window-guide element 6.4, 6.4B.

5 14. A vehicle door according to at least one of claims 1 to 11, characterized by use of two stiff window-guide elements 6.1a, 6.2a, 6.1aB, 6.2aB and the respective window guides 6.1, 6.2, 6.1B, 6.2B.

10 15. A vehicle door according to at least one of claims 1 to 11, characterized by use of one stiff window-guide element 6, 6B and two window guides.

15 16. A vehicle door according to at least one of claims 1 to 11, wherein the vehicle part, which is vehicle roof or passenger compartment, receiving the clamping parts is reinforced by a reinforcing plate or element and provided with reinforcing element and transverse girder of the post sections of both vehicle sides facing each other.

20 17. A vehicle door according to at least one of preceding claims, wherein the clamping part comprising mechanical connection elements such as screw, rivet, washer, nut, pin, clamping rings etc. and

- a clamping hook 15.6 with interior diameter  $d_1$  and gap  $s_1$  *or*
- a sleeve 15.11 and washer 15.13 with outer diameter D in case of clamping block, is provided with a means to adjust the tolerances between said part and the corresponding clamping part from outside the vehicle.

25 18. A vehicle door according to claim 17, wherein the front region of washer 15.13 has radial teeth.

30 19. A vehicle door according to at least one of claims 17 and 18, wherein the washer is an integral part of a screw.

35 20. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping hole in window-guide element 6.1a, 6.2a, 6.1aB, 6.2aB and
- a clamping block 15.1 rigidly attached to a reinforcing plate of the post section, whereto the transverse girder 17.2d and reinforcing panel 17.1c disposed along the vehicle roof or side rail are rigidly attached.

40 21. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping block 15.2a rigidly attached to block 6.11 of window-guide element 6.1a, 6.2a, 6.3, 6.4, 6.1aB, 6.2aB, 6.3B, 6.4B and
- a clamping hole in reinforcing panel 17.1 disposed along the vehicle roof or side rail, where said reinforcing panel 17.1 is rigidly attached to the post section and
  - to reinforcing plate 17.2a and transverse girders 17.2, 17.2b *or*
  - to reinforcing plate 17.2a.

22. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping hole in reinforcing panel 17.1a, 18.1, 18.1a disposed along the vehicle roof or side rail and

5 – a clamping block 15.2, 15.4, 15.4a fixed to window-guide element 6.1a, 6.2a, 6.3, 6.4, 6.1aB, 6.2aB, 6.3B, 6.4B.

23. A vehicle door according to at least one of preceding claims, wherein the compound pair: vehicle door / vehicle part, which is vehicle roof or side rail, is provided with a clamping means, in which

- a reinforcing rod 17.1d disposed along the vehicle part is fixed to two transverse girders 17.2e, 17.2f or 17.2f, 17.2g and
- at least two clamping hooks 15.6 are fixed to window-guide elements 6.1a, 6.2a, 6.3, 6.4 or 6.1aB, 6.2aB, 6.3B, 6.4B.

15 24. A vehicle door according to at least one of preceding claims, wherein the compound pair: juxtaposed vehicle doors / vehicle part, which is vehicle roof or side rail, is provided with a clamping means, in which

- a reinforcing rod 17.1d disposed along the vehicle part is fixed to transverse girders 17.2e, 17.2f, 17.2g and
- at least four clamping hooks 15.6 are fixed to window-guide elements 6.1a, 6.2a, 6.3, 6.4, 6.1aB, 6.2aB, 6.3B, 6.4B.

25 25. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping hole in auxiliary part 6.5, 6.5B fixed to window-guide element 6, 6B and
- a clamping block 30, 32, 35 fixed to reinforcing element 21.1, 21.4, 21.1B of the top transition region of passenger compartment 21.

30 26. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping block 30, 35 fixed to reinforcing element 21.2, 21.2B of the post-section-transition region of passenger compartment 21 and
- a clamping hole in auxiliary part 6.5, 6.5B fixed to window-guide element 6, 6B and impact beam 1, 1B.

35 27. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping block 30, 32, 35 fixed to reinforcing element 21.3, 21.5, 21.3B of the bottom transition region of passenger compartment 21 and
- a clamping hole in auxiliary part 6.5, 6.5B fixed to window-guide element 6, 6B and auxiliary part 6.6b, 6.7b, 6.8.

40 28. A vehicle door according to at least one of preceding claims, characterized by arrangement of an auxiliary part 6.5C adapted to the outer door-contour to window-guide element 6B and impact beams 1B, 7B.

29. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping block 37 rigidly attached to reinforcing element 21.4B, 21.6B, 21.5B of the post-section-transition region of passenger compartment 21 and
- a clamping hole in outer door-contour-shaped auxiliary part 6.5C.

5 30. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping block 31, 36 rigidly attached to auxiliary part 6.6a, 6.8 of window-guide element 6, 6B and
- a clamping hole in the post section reinforced by reinforcing element 23 and adjacent to said window-guide element.

10 31. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping block 33 rigidly attached to window-guide element 6, 6B and
- a clamping hole arranged in the post section reinforced by reinforcing element 23, provided with a part of door lock and adjacent to said window-guide element.

15 32. A vehicle door according to at least one of preceding claims, wherein the clamping means comprises

- a clamping block 34 rigidly attached to auxiliary part 6.7a of window-guide element 6, 6B and
- a clamping hole arranged in the post section reinforced by reinforcing element 23, provided with a part of door lock and adjacent to said window-guide element.

20 33. A vehicle door according to at least one of preceding claims, wherein a tailgate door, sliding side door or cargo door has the same features of the vehicle door.

25 34. A vehicle door according to all preceding claims, characterised by use of metal, compound material, glass fibre reinforced material or non-metal material for material of the clamping part, window-guide element, auxiliary part, reinforcing element (transverse girder, reinforcing rod, plate, panel) and U-shaped block.

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